UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/047,992	01/17/2002	Hitoshi Ohashi	020052	5363

23850 7590 04/20/2007

ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP
1725 K STREET, NW
SUITE 1000
WASHINGTON, DC 20006

EXAMINER	
TALBOT, BRIAN K	
ART UNIT	**PAPER NUMBER**
1762	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/047,992	OHASHI ET AL.	
	Examiner	Art Unit	
	Brian K. Talbot	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/5/07(RCE)*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,7,8;11,17,18 and 51-56* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,7,8,11,17,18 and 51-56* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/5/07 has been entered.

2. Claims 1,7,8,11,17,18 and 51-56 remain in the application.

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. In light of the amendment filed 12/21/06, entered per filing the RCE, the 35 USC 112 second paragraph rejections over claims 1 and 11 have been withdrawn.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim Rejections - 35 USC § 103

6. Claims 1 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sterett et al. (5,746,844) in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711).

Sterett et al. (5,746,844) teaches a method and apparatus for creating a three dimensional article using a layer-by-layer deposition of molten metal and annealing. The molten metal is applied by depositing the droplets in a predetermined pattern and rate (abstract).

Sterett et al. (5,746,844) fails to teach measuring and comparing data calculated by a monitoring device to control the deposited material.

Kudoh et al. (4,656,048) teaches a method of forming thick film circuit patterns with a sufficiently wide and uniform strip. The monitoring system measures and controls the distance of the nozzle from the substrate and compares that to a set value and performs and necessary changes to maintain the desired value (col. 2, lines 30-40, col. 3, line 55 – col. 4, line 35).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Sterett et al. (5,746,844) deposition process by incorporating a measuring/control system as evidenced by Kudoh et al. (4,656,048) to produce the desired circuit pattern.

Sterett et al. (5,746,844) in combination with Kudoh et al. (4,656,048) fail to disclosed the molten metal grains overlapping one another.

Tseng et al. (6,309,711) teaches a method of manufacturing a three-dimensional object whereby molten metal is jetted toward a substrate whereby the metal deposits are overlapping (abstract and Fig. 2).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Sterett et al. (5,746,844) in combination with Kudoh et al. (4,656,048) process by applying the molten metal material to be in overlapping fashion as evidenced by Tseng et al. (6,309,711) with the expectation of achieving the similar results, i.e. a conductive circuit.

Claims 1 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orme-Marmerelis et al. (6,520,402) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711).

Orme-Marmerelis et al. (6,520,402) teaches a high speed direct writing with metallic microspheres. Small droplets of molten metal are generated toward a substrate to form conductive traces (abstract).

JP 10-226,803 teaches a three dimensional body formed by various kinds of materials. Molten metal is spouted from a nozzle (10) to form droplets (20) that are applied to a substrate to form electric circuits (abstract).

Orme-Marmerelis et al. (6,520,402) or JP 10-226,803 fail to teach measuring and comparing data calculated by a monitoring device to control the deposited material.

Features described concerning Kudoh et al. (4,656,048) above are incorporated here.

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Orme-Marmerelis et al. (6,520,402) or JP 10-226,803 deposition process by incorporating a measuring/control system as evidenced by Kudoh et al. (4,656,048) to produce the desired circuit pattern.

Orme-Marmerelis et al. (6,520,402) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) fail to disclosed the molten metal grains overlapping one another.

Tseng et al. (6,309,711) teaches a method of manufacturing a three-dimensional object whereby molten metal is jetted toward a substrate whereby the metal deposits are overlapping (abstract and Fig. 2).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Orme-Marmerelis et al. (6,520,402) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) process by applying the molten metal material to be in overlapping fashion as evidenced by Tseng et al. (6,309,711) with the expectation of achieving the similar results, i.e. a conductive circuit.

Claims 7,8,17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711) further in combination with Pan (6,501,663).

Features described above concerning Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711) are incorporated here.

Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711) fail to specifically teach forming an insulating layer atop the molten layer.

Pan (6,501,663) teaches a three dimensional interconnect whereby an interconnect is covered with an insulator layer to protect the interconnect (abstract and Figs 5-7).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711) by incorporating an insulator layer atop the molten metal circuit layer as evidenced by Pan (6,501,663) with the expectation of achieving a multilayered structure or a protective layer for the circuitry.

Claims 51-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711) still further in combination with JP 11-040937.

Features described above concerning references Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844), JP 10-226,803, Kudoh et al. (4,656,048) and Tseng et al. (6,309,711) are incorporated here.

Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711) fail to specifically teach using compressed air for jetting the molten metal and using a mask to deposit the molten metal on a desired location of the substrate.

JP 11-040937 teaches injecting compressed gas in a pot of molten solder to jet the solder through a mask and onto a substrate (abstract).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711) process by incorporating a compressed gas to aid in the jetting of molten metal as well as the use of a mask to provide a desired pattern as evidenced by JP 11-040937.

While the Examiner acknowledges the fact that JP 11-040937 teaches molten metal whereas the instant claims are directed toward a molten metal for circuitry, it is the Examiner's position that the process disclosed is not limited to the material utilized. In fact, one skilled in the art at the time the invention was made would have had a reasonable expectation of achieving similar results with any molten "material".

Response to Amendment

7. Applicant's arguments filed 12/21/06 have been fully considered but they are not persuasive.

Applicant argues that the prior art fails to teach a "circumferential" movement in the X and Y direction.

While the Examiner acknowledges this fact, it is the Examiner's position that one skilled in the art at the time the invention was made would have had a reasonable expectation of achieving similar success regardless of the "movement" in the X and Y directions as long as these directions are followed. If Applicant disagrees, then Applicant is invited to provide a showing of unexpected results regarding the criticality of the "circumferential" movement vs. no-circumferential movement. Even assuming a showing can be provided, the reference does not preclude the movement being in the circumferential motion and it is the Examiner's position that this would be met by the reference. No such showing has been provided to refute the Examiner's position.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian K. Talbot whose telephone number is (571) 272-1428. The examiner can normally be reached on Monday-Friday 6AM-3PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BKTalbot 4/16/07

Brian K Talbot
Primary Examiner
Art Unit 1762

BKT